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Banking Flows and Financial Crisis

Financial Interconnectedness and Basel III Effects

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Abstract

This paper examines the factors that determine banking flows from advanced economies to emerging markets. In addition to the usual determinants of capital flows in terms of global push and local pull factors, it examines the role of bilateral factors, such as growth differentials and economic size, as well as contagion factors and measures of the depth in financial interconnectedness between lenders and borrowers. The analysis finds profound differences across regions. In particular, in spite of the severe impact of the global financial crisis, banking flows in emerging Europe stand out as a more stable region than is the case in other developing regions. Assuming that the determinants of banking flows remain unchanged in the presence of structural changes, the authors use these results to explore the short-term implications of Basel III capital regulations on banking flows to emerging markets.

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Banking Flows and Financial Crisis—Financial Interconnectedness and Basel III Effects

by

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Banking Flows and Financial Crisis—Financial Interconnectedness and Basel III Effects[*]

I. Introduction

The global financial crisis has led to a range of reform proposals concerning the regulatory framework governing the banking sector with a view to enhancing its resilience. Agreement has already been reached on some aspects of these new rules, which are collectively referred to as Basel III (Appendix 1). The proposed new regulations cover both micro-prudential or firm-specific measures, as well as macro-prudential measures aimed at strengthening the resilience of the banking system as a whole by addressing the pro-cyclicality of banking and limiting the risks arising from the interconnectedness among financial institutions. One of the cornerstones of the proposed reforms relates to strengthening the level and quality of the capital base through an increase in the minimum common equity requirement from 2.0 percent to 4.5 percent of assets and the introduction of a capital conservation buffer of 2.5 percent of assets. Within the proposed macro-prudential reforms, agreement has also been reached on the introduction of counter-cyclical capital buffers. To contain the excessive buildup of leverage, agreement has also been reached on introducing an internationally harmonized leverage ratio threshold that could serve as a backstop to the capital measure and on a new global minimum liquidity standard.

Although the proposed reforms are expected to generate substantial benefits (namely, by reducing the frequency and intensity of banking crises), concerns have been raised that, in the short term, the costs of moving to higher capital ratios may lead banks to raise their lending rates and reduce lending.[1] In particular, if these regulations are implemented over a short period of time, there could be a consequent drag on the economic recovery in countries adopting these regulations as well as in those emerging markets closely dependent on global banking flows.

Against this background, this paper examines the determinants of banking flows from advanced economies to emerging markets. It focuses primarily on the nature of the financial linkages between these countries after controlling for global push and local pull factors, as well as aggregate bilateral linkages. These results are then used to assess the possible impact on emerging markets of the regulatory changes under Basel III. We focus primarily on the financial flows channel; that is, the impact on banking flows through both direct and indirect lending.

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[1] Banks can meet higher capital ratios in three ways: (1) issuing new equity; (2) increasing retained earnings through a number of measures (by reducing dividend payments, enhancing operating efficiency, raising average margins between borrowing and lending rates, and increasing non-interest (fee) income); and (3) reducing their risk-weighted assets by lowering the size of loan portfolios, reducing or selling non-loan assets, and shifting their balance sheet towards less risky assets.

II. Literature Review

Three related strands of work have analyzed capital flows to developing countries. The first strand has focused on the relative roles of external (or push) factors and of domestic (or pull) factors underlying capital flows to emerging markets. The second strand of work has attempted to explain the so-called Lucas paradox (1990). Specifically, neoclassical theory would predict that, given the higher marginal product of capital in developing countries, capital should flow from rich (high capital per worker) countries to poor (low capital per worker) countries. In reality, however, these flows are much lower than would be expected. The third strand has focused exclusively on understanding banking flows, including their role in contagion in crises.

Numerous studies have focused on the role of push and pull factors in explaining capital flows to developing countries and have arrived at different conclusions with respect to their relative importance. One of the earliest articles analyzing the relative importance of push and pull factors in explaining capital flows is that by Calvo et al. (1993). They find that while domestic factors were important in explaining investment flows to Latin America in the early 1990s, the substantial co-movement in macroeconomic variables—such as between the real exchange rate and foreign exchange reserve flows—suggest the influence of common (external) variables. Fernandez-Arias (1996) looks at portfolio flows using an analytic model of international portfolio investment that he tests on a representative panel of middle-income countries. He finds that external factors are important in explaining portfolio flows. Kim (2000) uses structural decomposition analysis in four developing countries, and Ying and Kim (2001) use a VAR model to investigate the underlying shocks causing the capital inflows to Korea and Mexico; again, external factors are found to be important in explaining these flows. In particular, the latter study finds that US business cycle and foreign interest rates accounted for over 50 percent of the capital inflows to Korea and Mexico during the late 1980s and 1990s.

Several other authors, however, have found that domestic factors—growth, inflation, trade openness, political stability, domestic savings and investment rates—play a more important role in determining capital inflows. For instance Hernandez and Rudolph (1995) examine total private capital flows (FDI, portfolio and loans) and find that domestic factors that reflect a country's investment attractiveness (domestic investment and savings rates, and export growth) are important in explaining the flows to 22 developing countries during 1986-93. Chuhan et al. (1993) look at portfolio flows (bond and equity) and find that domestic and external factors were equally important in explaining flows to Latin America, but that domestic factors tended to be much more important in explaining flows to Asia. Bohn and Tesar (1996) look at US equity investments and also find domestic factors to be important. Finally, the World Bank (1997) suggests that the factors driving flows to emerging markets have changed over time and that the domestic factors became more important in the mid-1990s as compared to the early 1990s.

The work related to the Lucas paradox has followed from the theoretical explanations and can be grouped into two broad categories. The first category attributes the limited amount of capital inflows to developing countries to differences in fundamentals that affect the production structure of the economy, such as technological differences, factors of production, government policies, and institutions. The second category of explanations focuses on international capital market imperfections, mainly sovereign risk and asymmetric information that increase the level of uncertainty associated with the expected returns from investing in developing countries.

Empirical work that falls under the first group of explanations of the Lucas paradox includes Edwards (1991) who shows that government size and openness are important determinants of inward FDI from OECD to developing countries during 1971-87. Wei (2000) and Wei and Wu (2002), who use data on bilateral FDI flows from 18 industrialized source countries to 59 host countries during 1994-96, find that corruption reduces the volume of inward FDI. In addition, Alfaro et al. (2005) find, based on a cross-section of developed and developing countries, that institutional quality is an important determinant of capital flows and that policies play a significant role in explaining the changes in the level of capital over time. Under the second group of explanations, Portes and Rey (2005) find evidence that imperfections in the international credit markets can affect the amount and direction of capital flows while Lane (2004) finds that credit market frictions are a determinant of debt flows during 1970-95. More recently, a study by Kinda (2007) has combined the two approaches, in effect extending the Lucas paradox approach that considers only economic fundamentals (education, institutions) by including capital market imperfections and integrating the external factors of the "push-pull" literature. The focus of this paper is primarily on physical and financial infrastructure, with the finding that physical and financial development has a significant positive effect on FDI and portfolio investments respectively for a sample of 61 developing countries during 1970-2003.

Finally, the literature on cross-border flows has focused both on the determinants of these flows as well as their role in contagion. Among the literature that focused primarily on the factors that affect cross-border flows, it is worth noting the work by Ferrucci et al. (2004). They look at bank lending based on data from BIS reporting banks' lending flows to ten EME debtor economies and find that external factors were important determinants of this lending. Van Rijckeghem and Weder (2003) are among the first that emphasize not only push and pull factors, but also common lender effects. Specifically, they look at the exposure of lending countries on a country facing a capital account crisis and how that might impact their exposures on other countries. Relatedly, McGuire and Tarashev (2008) link cross-border flows to the health of the banking systems in both the source country as well as the recipient country. Herrmann and Mihaljek (2010) look at a a number of domestic and external factors, and emphasize in particular bilateral linkages by emphasizing gravity-type regressors; namely, language and distance. Herrero and Martínez Pería (2007) emphasize macroeconomic conditions in the recipient country and Papaioannou (2008) emphasize the role of institutional factors. Finally, Kaminski and Reinhart (2000) emphasized that cross-border flows play an important role in the transmission of crisis—and in fact more important than trade flows. This is in line with Calvo et al. (2008) who also emphasize that financial linkages increased the probability of crisis.

III. Background on Basel III

The range of estimates on the potential short-term impacts on lending rates, volumes and economic activity of adopting Basel III is quite broad. Two such estimates are the ones put forward by the Macro Assessment Group (MAG, 2010) and the Institute of International Finance (IIF a, 2010). Based on models covering 17 countries, the MAG report finds that the median estimated increase in lending spreads is roughly 15 basis points by 2015 in response to a 1 percentage point increase in the target ratios over four years. The IIF report, which looks at the Euro area, Japan and the United States, assumes a 2 percentage point increase in the target capital ratio (reflecting both the increase in capital adequacy ratios and the introduction of new

liquidity standards) and it finds that this results in an increase in the average lending spread of 132 basis points during 2011-15.

In part, these differences in estimates reflect differences in the regulatory changes assumed: whereas the MAG study focuses largely on the impact of a higher regulatory capital ratio, the IIF study also considers redefinition effects, higher trading book capital, and a (1 percentage point) countercyclical buffer. In fact, some market participants expect the effective increase in core Tier 1 capital requirements under the new rules (when all the capital related charges are taken into account, not simply those of the higher regulatory capital ratio) to be more than 2 percentage points, perhaps as high as 6 percentage points[2]. As highlighted by Slovik and Cournède (2011), the increase in capitalization will also depend on whether banks would fully maintain their current discretionary capital buffers above the regulatory minima. For instance, the MAG report assumes that the current benchmark level of common equity ratio is 5.7 percent of risk-weighted assets and will need to increase by 1.3 percentage points to meet the required 7 percent of risk-weighted assets by the end of the implementation period—thus, it does not incorporate the discretionary capital buffers into the changes introduced by Basel III.

The broad range of estimates also reflects different assumptions regarding the implementation period. This matters because the "stock" costs and "flow" costs of increasing capital differ. The "stock costs" of holding more equity on the balance sheets arise from factors such as taxes and agency conflicts that make equity capital more expensive regardless of how that equity comes on to the balance sheet (i.e., regardless of whether the equity is accumulated through new issuances or retained earnings). The "flow costs" are associated with the process of reaching the new capital ratios. Many observers have argued that the stock costs of holding more equity may not be very significant because, even though equity is more risky and thus costly, these risks (and hence costs) are likely to fall as banks deleverage.[3] In contrast, the flow costs will depend in part on the length of time given for implementation. Indeed, a more gradual phase-in period can enable banks to adjust to the new capital ratios in a least costly manner, such as through accumulating capital via retained earnings. The Basel Committee has stretched the full implementation of the capital ratios until 2019. However, there are indications that market pressures may lead banks to adopt these regulations at a faster pace.

Finally, the capital markets response as banks issue new equity will matter also. The IIF report assumes that the capital markets response is less elastic, which leads to a higher cost of equity. Much of this uncertainty is also subject to the strength of the recovery following the global financial crisis. In fact, the impact from higher lending rates and lower credit availability on economic activity is itself subject to uncertainty. The magnitude of the latter will depend, for instance, on the availability of different sources of financing. In countries where capital markets can provide an alternative source of financing, at least for large enterprises, the impact could be less. Moreover, the response of monetary authorities to any regulatory induced economic slowdown (and of course the scope there is for such a response) would also make a difference.

[2] See IIF 2010 b page 20.

[3] In an idealized world where the conditions of the Modigliani-Miller theorem hold, this effect is just enough to offset the increased weight of the more expensive equity in the capital structure so that the overall cost of capital stays fixed as the bank's leverage varies.

Table 1. Short-Term Impact of Basel III in Advanced Economies

Study	Impact on lending rates bps	Impact on economic activity %	Assumptions	Range[1/]	
				Increase in rates (bps	Decline in activity (pp)
MAG	15.4	-0.16 (four and a half years after implementation)	1 percentage point increase in common equity ratio, implemented over four years.	15-90	0.16-1.8
IIF	132 bps	-0.60	Package of regulations including a 2 percentage point rise in common equity ratio, capital redefinition effects and higher liquidity requirements.	66-396	0.3-1.8

1/ The range depends on how much capital adjustment is needed from a 1 percentage point increase to a 6 percentage point increase. The range of both the increase in interest rates and the decline in economic activity is obtained by taking the estimated impact under each study; namely, a 1 percentage point increase in common equity ratio and multiplying this by 1-6 percentage points.

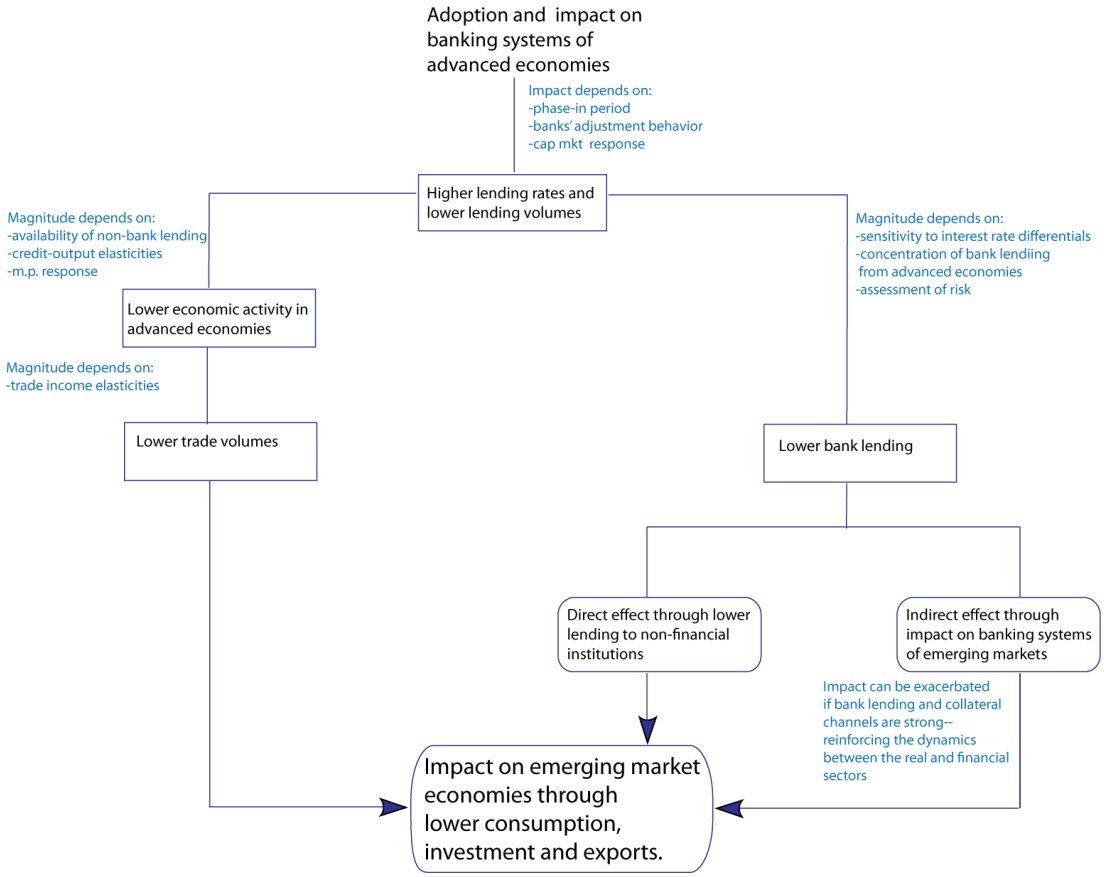
In sum, while the magnitude is subject to considerable uncertainty, there is agreement that there is likely to be some short-term impact in countries adopting Basel III.[4] To the extent that this short-term impact materializes, emerging markets are likely to be affected through several channels even if one excludes the impact from emerging markets themselves adopting Basel III regulations (Figure 1). Two of these channels are of particular importance. The first, which could be referred as the trade flows channel, acts through lower economic activity in advanced economies and consequent lower import activity on their part. This is the effect on advanced economies itself that transmist to emerging markets through lower trade activity. The quantitative impact of this channel depends on trade income elasticities. The second channel, which we will refer to as the financial flows channel, is through higher interest rates and the decline in banking flows from advanced economies to emerging markets. The quantitative impact will depend, inter alia, on interest rate differentials, global risks, and the overall dependence on such flows.

In turn, within the financial flows channel, there is a direct lending effect—lower lending from banks in advanced economies to non-banks in emerging markets—and an indirect lending effect—lower lending from banks in advanced economies to banks in emerging markets. These effects might reinforce each other in the presence of agency problems in financial markets due to asymmetric information and costliness of enforcing contracts. For instance, the curtailment of direct loans to firms in emerging markets could lead to a further decline in investment, economic activity and asset prices. Specifically, if collateral is an important determinant in banks' lending decisions, as is generally the case in emerging markets as a result of the costs of enforcing contracts, the decline in asset prices can reduce domestic bank lending. This reinforces the initial

[4] In the medium to long-term, banks would only face the stock costs of holding higher capital. The BIS has also undertaken a long-term impact study in which they consider both the benefits and the costs of the new regulations. It thus assesses the shift from one steady state to another (with and without reforms) once the transition to the higher capital standards has been achieved. They find that a one percentage point increase in the capital requirement translates into a 0.09 percent median loss in the level of steady state output. But there are of course benefits from holding higher capital in as much as it succeeds in lowering the frequency and severity of financial crises.

decline in direct lending from banks in advanced economies. The impact of the decline in lending by banks in emerging markets will also depend on the degree to which other forms of financing are or not available to borrowers. For instance, small and medium enterprises might not be able to offset the decline in bank lending, given their lack of access to stock or bond markets.

Figure 1. Short-Term Impact on Emerging Markets of Proposed Basel III Regulations



Source: Authors' illustration

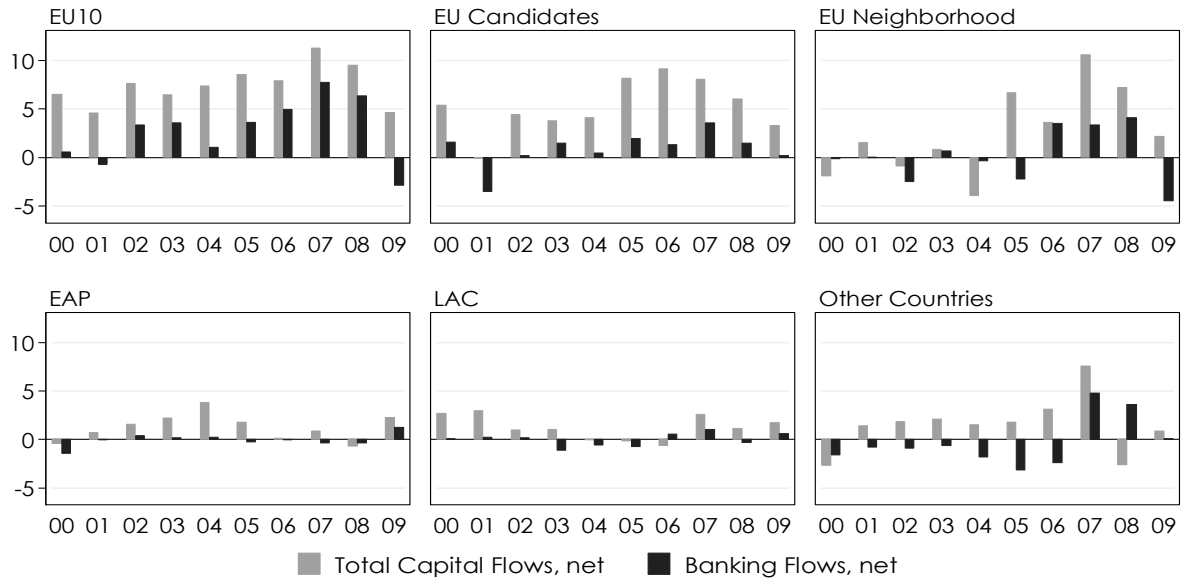
Based on an analysis of the determinants of banking flows from advanced to emerging markets, which includes an assessment of the nature of the financial linkages between these two groups of countries, this paper examines the impact of the regulatory changes under Basel III. We focus exclusively on the financial flows channel, through both direct and indirect lending. Examining the links between advanced and emerging markets, and how these may affect the magnitude of banking flows, is warranted in light of the following two observations.

- International banks have played a critical role in transferring capital from rich to poor countries, which in turn has aided the income convergence process observed in some emerging markets. As shown in Figure 2, there have been unusually sharp increases in these flows during the new millennium, particularly in regions where banking flows have played a dominant role in the years that preceded the crisis.
- Banking flows were an important transmission channel of the global financial crisis (Milesi-Ferretti and Tille, 2010) even if in some regions, in particular emerging Europe,

the reversal of banking flows was not as marked as the unprecedented inflows that preceded the crisis period would have suggested.

These observations would suggest that the nature of the financial linkages between advanced and emerging markets, which are also likely to vary by region, can be important determinants of banking flows. An analysis of the potential implications of Basel III for banking flows to emerging markets would therefore also need to take into account the nature of these financial linkages between countries and this is one of the goals pursued by this paper.

Figure 2. Changes in External Positions of Reporting Banks vis-à-vis EMEs—2000-09 (in percent of GDP; exchange rate adjusted changes)



Source: Authors' calculations based on IMF data (2011) and, for banking flows (net), the BIS locational statistics.

To this end, we rely on a detailed dataset of bilateral banking flows between 17 advanced economies and 38 emerging markets. This bilateral dataset allows us to construct indicators of financial interconnectedness both from the perspective of the country providing the capital and the country receiving the capital. In effect, this allows us to extend the literature on capital flows which, given the aggregate nature of the data used, cannot capture bilateral linkages. Based on this bilateral data, we address the following two key questions:

- What are the determinants of banking flows? In particular, what role does the nature of financial linkages play in determining the magnitude of these banking flows? Specifically,

    - The standard literature assumes that the key financial linkage is through interest rate differentials, adjusted for exchange rate movements (in nominal terms) as this determines the expected rate of return.[5]

[5] One aspect not covered among the determinants of banking flows relates to the medium-term strategic goals that parent banks might be pursuing and how this affects banking flows. Given the aggregate nature of our dataset this is not a subject that can be directly covered except through its plausible effect on overall home country financial interconnectedness.

- But, beyond this, does the magnitude of banking flows depend on the financial relationship or links between the home country (lender or capital provider) and the host (borrower or capital recipient) country?
- Also important is the extent to which the flows to emerging markets are affected by a portfolio rebalancing (or contagion) effect (banks in a home country reduce lending to all emerging markets when they are exposed to a country in crisis)?

- Based on these key determinants of banking flows to emerging markets, the second main question we pursue relates to the likely impact of the adoption of the proposed Basel III capital requirements in advanced economies on the banking flows to emerging markets?

IV. Methodology and Data

The empirical work in our paper relies on a dataset of annual bilateral banking flows and combines the work in the literature on capital flows as well as the literature on financial interconnectedness. As Kim et al. (2011), we focus first on global push and local pull factors. Given the bilateral nature of our dataset, however, we also expand the coverage of determinants to include aggregate features in the relationship between countries, as well as the factors that might reflect the depth of their financial relationship and their response to crisis developments.

The analysis is based on an unbalanced panel of bilateral banking flows from advanced countries to emerging markets. The data is taken from the BIS locational banking statistics; it comprises gross international financial claims of banks resident in a given country on the bank and the non-bank sector of emerging markets. This series differs from the BIS consolidated banking data in three important respects. First, it reports the creditor data based on a residence (host country) basis as opposed to a nationality (home country) basis. Second, and most importantly for our purposes, information on the flows between parent banks and emerging market subsidiaries are not excluded in the locational data as is the case in the BIS consolidated data. Finally, the BIS locational data are more relevant for countries receiving external loans because the way this database measures lending flows is consistent with balance of payments statistics, which in turn allows for a better matching of cross border flows and of the various macroeconomic and financial system characteristics of emerging markets.

The dependent variable is the log of the change in the external position of reporting banks in an advanced economy i (i=1,.., 17) vis-à-vis emerging market j (j=1,.., 38) at time t (t=1990,.., 2009). The dependent variable enters our regressions as changes in the external positions adjusted for the exchange rate valuation in a given year. Since the dependent variable can in principle take negative values (e.g., whenever country i provides some positive amount of loans, but these are smaller than the repayments by country j to country i), we follow the method proposed by Papaioannou (2009), and also used by Herrmann and Mihaljek (2010), when applying logs to the changes in external positions. Specifically, when the dependent variable adopts negative values, we take the logarithm of the absolute value and assign to it a negative value. This transformation preserves the original variable sign and retains the symmetry in the data. As shown in Table 2, the dependent variable has a broadly similar number of positive and negative values and, unlike bilateral trade flows, the share of zero values in the sample is quite small.

Several potential determinants of banking flows are explored. The literature examining these flows is not as developed as the literature on capital flows, in part because data on banking flows is not as readily available. As with capital flows more generally, banking flows are in part determined by *global push factors*. This includes a number of global channels, from developments in real US interest rates to alternative measures of risk appetite and market volatility, as well as world real GDP and trade volumes growth. Also crucial for capital flows, and banking flows are a priori no exception, are factors in the capital recipient country that impact the behavior of capital providers—the *local (or domestic) pull factors*.

Table 2. Descriptive Statistics of Dependent Variable

Variable	Obs	Share	Mean	Std. Dev.	Min	Max
Less than zero	2903	37	-3.71	1.92	-10.11	-0.10
Zero	1138	15				
Greater than zero	3762	48	4.29	1.98	0.10	10.24

Moreover, given the bilateral nature of the BIS locational dataset, issues specific to the *links or relationships between pairs of countries (lenders and borrowers)* of both a *non-financial* and a *financial* nature are considered. Non-financial links include bilateral differences in economic size and growth, in part because these can reflect the relative attractiveness of remaining within the home (lender) country versus lending to a host (borrower) country. Finally, given the increasing importance of cross-border financial links, and the obvious role these should play in determining banking flows, four factors that reflect the more detailed financial links between lenders and borrowers should be considered.

First, a key factor is the role of interest differentials. Capital can be expected to flow in response to higher interest rates in emerging markets (positive interest rate differential), though this should also be adjusted for nominal exchange rate depreciation in the emerging market currency over the period ahead as what matters for the lender is the expected rate of return in his currency; thus, we control for non-lagged changes in bilateral exchange rates.

Second, the exposure of a lender country's banking sector to individual emerging markets. In other words, the measure of bilateral relationship that is of relevance for lenders. As always, however, there is a trade-off in this relationship. There are pros and cons of concentration in banking activities; the former in terms of extraordinary profits that come from having a dominant role in the sector and the latter in terms of risks from lack of diversification.

Third, the dependence of an emerging market to a specific advanced economy also matters. This is a measure of the bilateral relationship of relevance to borrowers. For example, while 4 percent of Sweden's global exposures have Estonia as a destination, for the latter Sweden represents 68 percent of all its sources of banking flows. In this context, other lenders might view excessive concentration as a risk factor and thus choose to stay away from this country—diversification is a magnet, concentration is not for new lenders.

Fourth, the impact on banking flows to emerging markets as a result of developments in other emerging markets also needs to be considered. Since few emerging markets are interconnected among them, this occurs through a rebalancing process in the advanced economies themselves. In particular, a lender's exposure to a crisis hit emerging market could trigger a reassessment of risk of lending to all other emerging markets and the need to shore up resources—both of which could be expected to affect banking flows to emerging markets.

Given the above discussion, we may group the independent variables into four categories: (i) global push factors; (ii) local (or domestic) pull factors; (iii) lender-borrower links that do not pertain to the financial relationship among them;[6] and (iv) variables that capture bilateral financial relationships, including interest differentials adjusted for bilateral exchange rate changes, as well as lender-specific (home country) and borrower-specific (host country) banking exposure factors. We also explore, admittedly in a limited manner, the possible role of re-balancing style contagion that materializes through banking flows. Most regressors, except for the global factors, enter the estimation as one year lags; another exception is the re-balancing (contagion) variable, which we examine both in its lagged and non-lagged specification. A more detailed discussion of determinants of banking flows now follows.

Global push factors. We include in the regressions the (log of) S&P500 volatility index of the Chicago Board Options Exchange, a measure that is typically used as an indicator of expected short-term uncertainty in global financial markets. The expected sign of this coefficient is negative—greater uncertainty should reduce banking flows. We also experimented with other global indicators, such as world real GDP and trade volumes growth and real US interest rates, as well as measures of risk aversion such as the difference between alternative measures of 10-year interest rates and US treasuries. The conclusions remain largely unchanged.

Variables that capture local (or domestic) pull factors. We include measures at the host or borrower country level which are of an aggregate (economy wide) nature and aim at capturing broad macroeconomic conditions as well as the borrower's structural characteristics. As a measure of initial conditions we include the degree of trade openness. Under the macroeconomic conditions we include the lagged current account balance as a percentage of GDP and the lagged fiscal balance as a percentage of GDP.[7] The sign on the coefficient on the current account balance is ambiguous. On the one hand, a negative coefficient could be expected in that a higher current account balance in the past means that less borrowing is required to finance the current account; in other words, there is a certain persistence in the determinants of capital flows. On the other hand, a positive coefficient could be expected if the current account balance is seen by lenders as a measure of the strength of the countries macro fundamentals (so a higher current account balance is associated with stability and thus more financing is likely to be made available). The coefficient on the fiscal balance is expected to be positive on the assumption that the fiscal balance is a measure of the strength of macroeconomic policies. For instance, a higher fiscal balance is expected to be correlated with a lower probability of default. Needless to say, as with the current account, the opposite is also possible.

We also include the lagged Reinhart and Rogoff (2004) exchange rate regime index. A high index reflects a more flexible exchange rate system. The coefficient on the exchange rate regime is expected to be negative; namely, the more flexible the exchange rate, the more uncertain are the lender's returns and hence the lower are the cross border flows.

As to structural factors, we include the lagged Chinn-Ito index as a de jure measure of capital account openness. The higher the index, the greater the capital account openness; hence, the coefficient on this variable is also expected to be positive. Other structural measures

[6] Some authors, such as Herrmann and Mihaljek (2010), link these determinants to the kind of regressors used in gravity-type trade studies. As we discuss later, we find these transaction costs less important in financial flows as the cost of transport applies mostly only to trade flows.

[7] All lender and borrower regressors are included with a lag to minimize endogeneity concerns.

considered were the quality and stability in political institutions in emerging markets as measured by the International Country Risk Guide (ICRG) index. The coefficient on this variable was positive. More precisely, the more stable are a country's political institutions, the larger the cross border flows to this country. But it also restricted the sample size so we chose to drop it from our final specification. Also, the ease of doing business might affect extrepreneurial activities more directly and banking activity indirectly; however, we did not pursue this aspect of underlying structural characteristics.

Variables that capture non-financial bilateral links. Trade-related gravity models have been used to predict trade volumes. They were first pioneered by Tinbergen in 1962 and, more recently, similar models have been used to predict bilateral population flows and financial asset flows. We include two economic variables; the (log of) GDP per capita of the borrower (host) country and of the lender (home) country (in PPP terms) as a measure of relative country size, and the real GDP growth differential between the borrower and the lender. Although gravity models generally postulate a positive coefficient for the size of the economy in both the lending and borrowing country, it can be argued that the larger is a lender country's home market, the less is its dependence on foreign markets (i.e., a negative coefficient). Also, stronger growth in the borrower country is expected, ceteris paribus, to result in an increase in the loans to that country. Thus, the coefficient on the growth differential (defined as the GDP growth rate of the borrower minus the GDP growth rate of the lender) is expected to be positive.

We did not pursue, however, other gravity-type variables, such as common language and distance as is done by others to capture higher transaction costs (e.g., Herrmann and Mihaljek (2010)). In our view, banking flows are less affected by variables that reflect transport costs; such costs should not be as important for financial transactions. In contrast, the aggregate bilateral links are likely to be affected by indicators that relate to the flow of information. For example, we worked with the share of trade in total trade between two countries as well as the share of trade in indicators that could reveal more precisely the flow of information. Among the latter we looked at the number of minutes in telephone conversations. But the direction of the flow of information is unclear. For example, while the data allows us to capture who initiates the conversation, the information flow can go in both directions once the connection has been established. Also, we experimented with the share of bilateral newspaper trade in total news trade (and in total trade). This allows for greater certainty with regard to the direction of the information. Both indicators had the expected sign (greater interconnection would lead to greater banking flows), but the resulting sample size was much smaller; thus, we did not pursue this further.

Variables that capture financial linkages. As noted before, the first variable in this category is the interest rate differential between the borrower and lender (difference in monetary market rates). As in Herrmann and Mihaljek (2010), we look only at nominal (as opposed to real) interest rates as banks' lending decisions are assessed in such way. The sign on this coefficient is expected to be positive: relatively higher interest rates in the borrower vis-à-vis the lender country is expected to lead to higher banking flows. We include the percentage change in the bilateral exchange rate (where the exchange rate is defined as borrower's currency to lender's currency) as would be suggested for the interest parity condition to hold. In other words, one would expect capital flows to increase in response to an increase in interest rate differentials (adjusted for nominal exchange rate depreciation in the period ahead (e_{t+1}/e_t) as what matters for the lender is the expected rate of return on his own currency. This also serves to control for other

underlying factors. For example, a weaker currency in the borrower country could be expected, ceteris paribus, to reduce the flow of cross border loans (depreciation in the borrower's currency lowers expected returns in the lender's currency) as this would also make it more difficult for loans to be serviced; in sum, the expected sign of this regressor is negative.

In addition, we expect that some proportion of the cross border banking flows will be determined by financial or banking sector developments in the lender country. For instance, concentration in banking activities from the lender's perspective provides opportunities but could also entail risks due to the lack of diversification. To this end, we include the share of lending of any one advanced economy to each individual emerging market (e.g., the share of flows from Sweden to Latvia as a share of Sweden's total lending). Overall, we would expect that the risk of lack of diversification outweighs the opportunities of sector dominance. This regressor should therefore be expected to have a negative coefficient. But the opposite coefficient is also possible.

Some proportion of the cross border flows can also be expected to be determined by financial or banking sector developments in the borrowing country. Here too we focus on concentration of flows from a few sources, but viewed this time from the borrower's perspective. The concentration in the financial relationship of emerging markets can be picked in a number of ways. We choose to include a variable that is the share of flows from a source or home country in a particular emerging or host country as a share of total borrowing by the host country (e.g., flows from Sweden to Latvia as a share of Latvia's total borrowing). The coefficient is expected to be negative. In other words, excessive exposure would be a disincentive for banking flows. It could also have the opposite sign if one considers that the capital providing country has developed a dependency. However, we feel this is less likely as what is being captured here is the attractiveness of a recipient country as opposed to the willingness of capital providers.

As to the role of contagion, we use a variable that was first used to our knowledge by Herrmann and Mihaljek (2010). Specifically, a dummy variable is created for each capital account crises over the past two decades and is in turn interacted with the share of each lender's exposure to the crisis country (or groups of countries). We then examine how this affects banking flows. We focus on both a contemporaneous and a lagged specification of this variable. The hypothesis is that being overly exposed to a crisis country (or groups of countries) leads to a re-balancing of a lender's exposure, be it because of a new appreciation of risk or because of a need to shore up resources to confront the potential losses that might arise from these exposures.

V. Estimation Results

The econometric work is carried out using a fixed effects estimator with clustered standard errors using both home and host fixed effects. Unlike Hermann and Mihaljek (2010) who use a similar dataset (their dataset, however, is based on quarterly rather than an annual frequency), the Hausman specification test shows that there is a systematic difference between the fixed and random effects models. We add one at a time each of the four groups of determinants previously described to assess the impact on the aggregate specification and the stability of point estimates. The end goal is to keep within each of the four groups of regressors we use (i.e., global push factors, local pull factors, bilateral non-financial links, and bilateral financial links) as parsimonious a specification as is deemed possible.

Exploring Traditional Determinants of Capital Flows

The estimation results are presented in Table 3. Column 5 presents the specification that drives the paper's conclusions. The R-squared is low as would be expected in a panel dataset as the variation across different data points at a point in time is usually greater than across time for any one subject (country pairs) in the dataset. The coefficients are of the expected sign and, for the most part, statistically significant. The variable measuring the developments in the global environment (log of volatility index) is negative and significant at the 1 percent level—the greater the uncertainty in the global environment, the lower the cross-border flows (column 1). As noted earlier, we experimented with some of the other indicators of global conditions, such as real US interest rates and world GDP and trade growth. The conclusions did not materially change.

Table 3. Determinants of Banking Flows from Advanced to Emerging Markets

	(1)	(2)	(3)	(4)	(5)
	FE	FE	FE	FE	FE
	Global Push Factors	Local Pull Factors	Bilateral Links	Financial Links	Full Model
S&P 500 volatility index, in logs	-0.9101***				-0.5711***
	[0.141]				[0.134]
Trade openness in country *j* (% of GDP)		0.0040			0.0093**
		[0.003]			[0.005]
Exchange rate regime in country *j* (larger, more flexible)		-0.3452***			-0.2620***
		[0.060]			[0.071]
Current account balance in country *j* (% of GDP)		-0.0148			-0.0261*
		[0.013]			[0.014]
Fiscal balance in country *j* (% of GDP)		0.1294***			0.0799***
		[0.018]			[0.021]
Capital account openness in country *j* (larger, more openness)		0.2580***			0.2324***
		[0.070]			[0.071]
Per capita GDP, PPP, in country *j*, in logs			2.4700***		1.2305**
			[0.466]		[0.541]
Per capita GDP, PPP, in country *i*, in logs			-3.3452***		-2.5467***
			[0.665]		[0.843]
Differential real GDP growth between country *j* and country *i* (p.p.)			0.0976***		0.0433***
			[0.013]		[0.014]
Differential interest rate between country *j* and country *i* (p.p.)				0.0115*	0.0312***
				[0.006]	[0.008]
Change in bilateral exchange rate (%, country *i* per country *j*)				-0.0414***	-0.0366***
				[0.004]	[0.004]
Banking exposure to country *j* (% of total position of banks in country *i*)				-0.7905***	-0.9421***
				[0.293]	[0.281]
Banking exposure to country *i* (% of total position in country *j*)				-0.1449***	-0.1335***
				[0.025]	[0.023]
Number of Observations	7,803	7,803	7,803	7,803	7,803
Number of Home-Host Pairs	553	553	553	553	553
R^2 (within)	0.007	0.026	0.018	0.047	0.072

Robust standard errors in between brackets. Asterisks indicate statistical significance at the ***1, **5, and *10 percent level. Constant is not reported.

The results on the host (emerging) economy pull factors are also largely as expected for initial conditions and macroeconomic variables (column 2). The initial level of trade openness is positive and statistically significant at the 1 percent level. On the macroeconomic side, the coefficient on the lagged current account balance is negative but not significant; namely, a higher balance results in lower financing needs, though the coefficient is weakly defined. In column 5, however, the regressor is statistically significant at the 10 percent level. The coefficient on the

lagged fiscal balance is positive and significant at the 1 percent level. Specifically, a higher fiscal balance results in higher cross-border flows as the fiscal balance is perhaps looked at as a measure of the strength of macroeconomic fundamentals. The point estimate on the (lagged) exchange rate regime is negative, as expected, and significant at the 1 percent level.

On the structural side, the lagged Chinn-Ito index of capital account openness is used. The higher the index, the greater the capital account openness—and the coefficient is indeed positive and statistically significant. We also considered the ICRG average index; it is positive (a higher number corresponds to more predictable political institutions) and also statistically significant. It reduces however our sample size so we opt not to keep it in our final specification.

The variables measuring the strength of the non-financial bilateral ties between an advanced and emerging partner country all have plausible signs. Larger per capita GDP in the home (advanced) country is associated with lower flows, while a larger per capita GDP in the host (emerging) country is associated with higher flows (and both are statistically significant). The addition of these variables is justified also as a scaling factor. Similarly, the coefficient on the growth differential is of the expected sign (with higher relative growth in the host/emerging market being associated with higher flows) and also statistically significant.

Exploring Financial Linkages

The next step is to discuss the indicators that represent the financial linkages. The coefficient on the interest differential—a standard determinant of banking flows—is as expected: positive and significant at the 1 percent level (that is, higher interest rate in the host market is associated with higher flows). The coefficient on the nominal exchange rate is also, as expected, negative and significant—a depreciation of the emerging market currency reduces flows.

The point estimates on the links between the home and host banking sectors offer some additional insights on financial interconnectedness. The coefficient on the share of flows going to one particular emerging market relative to flows to all other emerging markets from any one advanced economy is negative and significant at the 1 percent level. As mentioned earlier, the high exposure is both an opportunity (sector dominance) and a risk (lack of diversification)—the latter appears to be more important. Also, from the perspective of the host country, the banking-specific factors relate to the degree of dependence of banking operations. As with the lending country, the more dependent is a country on a few source countries, the lower are the cross-border flows. Presumably, the more dependent a borrowing country is on a few originating sources, the riskier it is perceived by other lenders; this must dominate and explains the decline in volume of flows. The coefficient is also statistically significant at the 1 percent level.

Also of interest is the degree to which the impact of interconnectedness varies across regions. To this end, Table 4 presents estimations that interact each of the banking-specific regressors with regional dummies—a EU10 dummy, a EU candidates dummy, a EU neighborhood dummy, a Latin American dummy, and a dummy for other emerging markets; the latter includes CIS countries that are not part of the EU neighborhood. The estimation follows column 5 in Table 3, but shows only the coefficients for each regional dummy together with the non-interacted coefficient. We test the null that adding both coefficients (the stand alone coefficient plus the interaction with the regional dummies) results in a statistically significant coefficient in an attempt to identify differences in financial interconnectedness across regions. The expectation is that this will tell us something about the stability of funding (advanced economy perspective) and the implications of dependence (emerging market perspective).

It is worth noting that the home country exposure is not statistically significant among the EU10 and EU candidate countries, suggesting that excess exposure of lender countries might not trigger a meaningful decline in banking flows. In contrast, the EU neighborhood, LAC countries and other emerging market economies do provide evidence of a greater role for diversification in exposures—as opposed to sector dominance. This is consistent with the experience of emerging Europe during the global financial crisis. Either because of the role of parent banks that wished to avoid a fire sale of assets or of the Vienna initiative (or most likely both), there is less of a decline in banking flows, at least relative to what might have been expected given the unusually large banking flows that preceded the crisis in this region. The implication is that banking flows going to the EU10 and the EU candidate countries appear to be more stable.

Table 4. Financial Linkages and Regional Factors

	(1)	(2)	(3)	(4)	(5)	(6)
	FE	FE	FE	FE	FE	FE
	Full Model	EU10 Countries	EU Candidates	EU Neighborhood	LAC Countries	Other EMEs
Lender's (HOME) Perspective						
Banking exposure to country *j* (% of total position of banks in country *i*)	-0.9421***	-1.5920***	-0.8669***	-0.8708***	-0.9520***	-0.6764**
	[0.281]	[0.426]	[0.278]	[0.285]	[0.345]	[0.278]
- Interacted with Regional Dummy		1.3558***	-0.2358	-2.9489***	0.3314	-1.7877**
		[0.511]	[1.104]	[0.794]	[0.566]	[0.880]
- Sum of two coefficients		-0.236	-1.103	-3.820***	-0.621***	-2.464***
- Test (H0: the sum is not statistically distinguishable from 0) (p-value)		0.39	0.30	0.00	0.00	0.00
Borrower's (HOST) Perspective						
Banking exposure to country *i* (% of total position in country *j*)	-0.1335***	-0.1679***	-0.1644***	-0.1445***	-0.1079***	-0.0915***
	[0.023]	[0.031]	[0.026]	[0.027]	[0.024]	[0.024]
- Interacted with Regional Dummy		0.0859*	0.1875***	0.0789*	-0.2355***	-0.1849***
		[0.048]	[0.045]	[0.043]	[0.078]	[0.060]
- Sum of two coefficients		-0.082**	0.023	-0.066**	-0.343	-0.277***
- Test (H0: the sum is not statistically distinguishable from 0) (p-value)		0.02	0.54	0.05	0.16	0.00
Number of Observations	7,803	7,803	7,803	7,803	7,803	7,803
Number of Home-Host Pairs	553	553	553	553	553	553
R^2 (within)	0.07	0.08	0.07	0.07	0.08	0.08

Robust standard errors in between brackets. Asterisks indicate statistical significance at the ***1, **5, and *10 percent level. Constant is not reported.

In contrast, if a borrowing country is overexposed, this does result in lower banking flows in almost all the regions we have specified. The one exception appears to be the EU candidate countries, which have a non significant combined coefficient. Here too, however, it is worth noting that the coefficients in emerging Europe are smaller (and not significant among the EU candidates as already noted) than is the case for most emerging markets outside Europe. For example, the combined coefficient for the EU10 countries is -0.082, and this is quite lower than the coefficient for other emerging markets where the combined coefficient is -0.277.

What can be said about the importance of contagion and the rebalancing of exposures? The hypothesis we are exploring is that rebalancing takes place through an advanced economy so that those lending countries that are exposed to a crisis country are more likely to reduce their exposures elsewhere. This could be both because of a re-assessment of risk or the need to shore up resources given the impact of the crisis on the lenders' own worldwide balance sheet. We pursue this question by adding to our main specification individual dummy variables constructed based on past capital account crises events that are, in turn, interacted with the exposure of each

lender country to the corresponding crisis country (Table 5).[8] We focus on the following capital account crises events: Mexico (1995), East Asian (1998), Russia (1999), Turkey (2001), and Argentina (2002), as well as eleven capital account crises events identified in Ghosh et al. (2008).[9] The individual dummies are timed, with one exception, based on the year in which the reversal in current account deficits occurred. The exception is Ghosh et al., which is timed based on an index of market pressures. Both contemporaneous and lagged interactions are examined.

Table 5. Contagion Effects of Past Capital Account Crises

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Crisis Episodes											
	Mexico		Russia		East Asia		Turkey		Argentina		Ghosh et al. (2006)	
	Non-lag	Lagged	Non-lag	Lagged	Non-lag	Lagged	Non-lag	Lagged	Non-lag	Lagged	Non-lag	Lagged
Banking exposure to country *j* (% of total position of banks in country i)	-0.949*** [0.281]	-0.9553*** [0.281]	-0.914*** [0.279]	-0.936*** [0.281]	-0.905*** [0.275]	-0.924*** [0.279]	-0.918*** [0.279]	-0.931*** [0.279]	-0.946*** [0.281]	-0.942*** [0.281]	-0.966*** [0.284]	-0.814*** [0.268]
Banking exposure to country *i* (% of total position in country j)	-0.133*** [0.023]	-0.133*** [0.023]	-0.134*** [0.023]	-0.133*** [0.023]	-0.135*** [0.023]	-0.134*** [0.023]	-0.134*** [0.023]	-0.134*** [0.023]	-0.134*** [0.023]	-0.134*** [0.023]	-0.133*** [0.023]	-0.136*** [0.023]
Common Lender Effect:												
- Mexico (1995)	0.919 [1.520]	2.450*** [0.535]										
- Russia (1999)			-1.720*** [0.338]	-0.837 [1.176]								
- East Asia (1998)					-4.515* [2.737]	-2.847 [2.043]						
- Turkey (2001)							-6.285** [2.505]	-3.929** [1.932]				
- Argentina (2002)									1.328 [2.606]	0.989 [3.479]		
- Countries in Ghosh et al. (2006)											0.377 [0.747]	-2.340*** [0.606]
Number of Observations	7,803	7,803	7,803	7,803	7,803	7,803	7,803	7,803	7,803	7,803	7,803	7,803
Number of Home-Host Pairs	553	553	553	553	553	553	553	553	553	553	553	553
R^2 (within)	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08

Robust standard errors in between brackets. Asterisks indicate statistical significance at the ***1, **5, and *10 percent level. Constant is not reported.

The main conclusion from these estimations is that quite a few of these crises appear to have had a contagion and rebalancing effect that was durable enough to be picked up in annual data; namely, Russia, East Asia, Turkey, and the capital account crises episodes in Ghosh et al. (2008). There are a few exceptions, however. The Mexico crisis appears to have the wrong sign, perhaps because this crisis had a large domestic financing feature through the so-called *tesobono* crisis—local currency bonds indexed to the Mexican peso-US dollar exchange rate. The coefficients also seem to suggest that a few of these crises were more marked than the others. For instance, the East Asian and the Turkey crises seem to have had a deeper impact than the Russia crisis—and the duration of the Turkey crisis extends beyond one year. An alternative interpretation, however, is that the timing of these crises might also play a role as some have occurred late in the calendar year and thus might impact data in our empirical work covering more than one year. The use of quarterly data would in principle enable a more accurate timing of the contagion effects of capital account crises episodes—a subject for future research.

[8] For simplicity in the presentation, all the regressors not related to financial linkages are excluded from the table.
[9] The capital account crises covered in Ghosh et al. (2008) include: Argentina (2001), Brazil (1998), Bulgaria (1996), Ecuador (2000), Indonesia (1997), Korea (1997), Malaysia (1997), Russia (1998), Thailand (1997), Turkey (2000), and Uruguay (2002).

VI. Discussion

Contribution of Different Determinants of Banking Flows—2008 Crisis and Beyond

In order to examine the contribution during the 2008 crisis of the different factors that impact banking flows, we begin by calculating the sensitivity of these flows to shocks in each of the four groups of regressors we have defined. We do so by running the same fixed effects estimation after normalizing all the variables so that we can interpret each estimated coefficient as a standardized coefficient. This allows us to add the coefficients within each of the four groups of determinants and explore their economic significance after assuming each has improved by the same amount—say, a 1 percent positive shock, as we do in Table 6. The main conclusion is that financial interconnectedness indeed plays, ceteris paribus, an important role in determining banking flows—a 0.67 percent change for each 1 percent change in financial interconnectedness. Domestic and bilateral factors are also quite important; respectively, 0.36 and 0.41 percent for each 1 percent change. Global factors are less important, however, at least judging by their impact after a 1 percent shock (only 0.05 percent). At any point in time, however, the overall impact on an economy will depend also on the actual size of the economic shock that affects each of these banking flow determinants.

Table 6. Banking flows and Sensitivity to Shocks

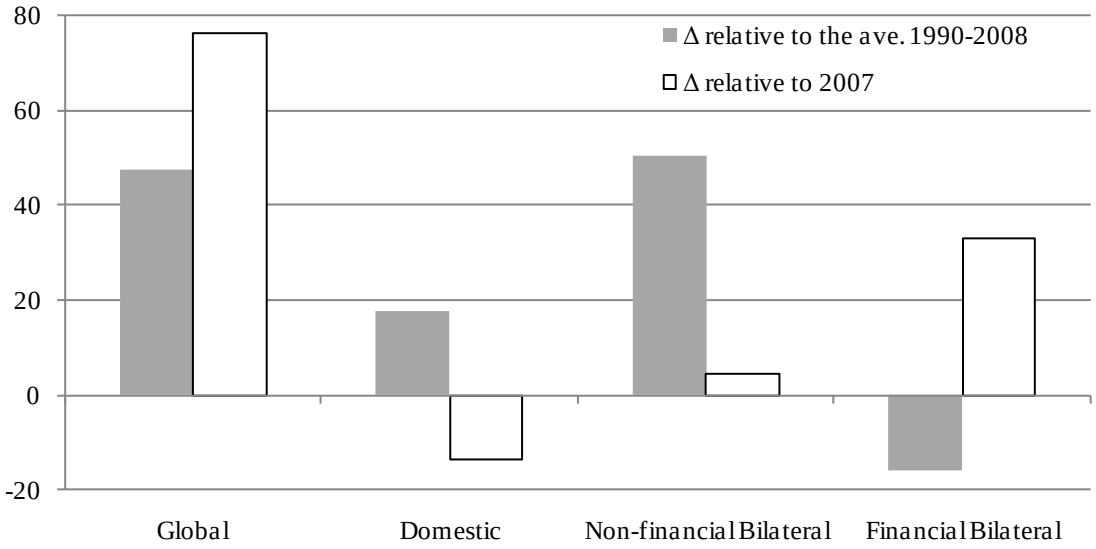
Name	Obs.	Mean	Std. Dev.	Min.	Max.	Standardized coefficient (Full Model)	Impact of 1% positive increase in each group of determinants	
S&P 500 volatility index, in logs	7,803	2.98	0.36	2.45	3.69	-0.0507	Global Push	0.05
Trade openness in country *j* (% of GDP)	7,803	81.29	44.59	12.10	220.41	0.1011		
Exchange rate regime in country *j* (larger, more flexible)	7,803	2.40	1.10	1.00	5.00	-0.0706		
Current account balance in country *j* (% of GDP)	7,803	-1.98	5.96	-26.88	18.04	-0.0380	Local Pull	0.36
Fiscal balance in country *j* (% of GDP)	7,803	-2.34	3.66	-21.70	8.94	0.0714		
Capital account openness in country *j* (larger, more openness)	7,803	0.18	1.37	-1.81	2.54	0.0775		
Per capita GDP, PPP, in country *j*, in logs	7,803	8.83	0.69	6.66	10.29	0.2072		
Per capita GDP, PPP, in country *i*, in logs	7,803	10.21	0.26	9.49	10.88	-0.1600	Non-financial bilateral	0.41
Differential real GDP growth between country *j* and country *i* (p.p.)	7,803	2.44	4.44	-18.71	17.11	0.0469		
Differential interest rate between country *j* and country *i* (p.p.)	7,803	8.58	14.99	-10.31	100.00	0.1142		
Change in bilateral exchange rate (%, country *i* per country *j*)	7,803	7.09	16.96	-20.04	98.80	-0.1513	Financial bilateral	0.67
Banking exposure to country *j* (% of total position of banks in country *i*)	7,803	0.21	0.51	0.00	7.54	-0.1172		
Banking exposure to country *i* (% of total position in country *j*)	7,803	4.92	8.94	-0.02	86.41	-0.2913		

Source: Authors' calculations.

As to the question on the determinants of banking flows during the global financial crisis, we carry-out two different exercises (Figure 3). In the first we look at the determinants of banking flows during 2008, which by most accounts was when global factors deteriorated the most, relative to their average values over the period 1990-2008. In the second, the comparison is relative to the values of banking flows determinants in 2007; that is, prior to the crisis. The latter is the correct comparison if the purpose is to understand what drove the impact of the crisis. Clearly, what matters here is the value of the regressors in 2008 relative to one of the two benchmarks and one would expect global factors to play a key role. And indeed this is the case. The increase in market volatility explains close to 76 percent of the decline in banking flows in 2008. Financial interconnectedness also had a negative impact (some 35 percent, slightly less

than half of what was explained by global developments). It is worth noting that domestic pull factors in fact played a supportive role leading to an increase in flows of little over 10 percent.

Figure 3. Contribution of Different Factors during the 2008 Crisis (% of total change)



Source: Authors' calculations.

Possible Impact of Basel III on Banking Flows

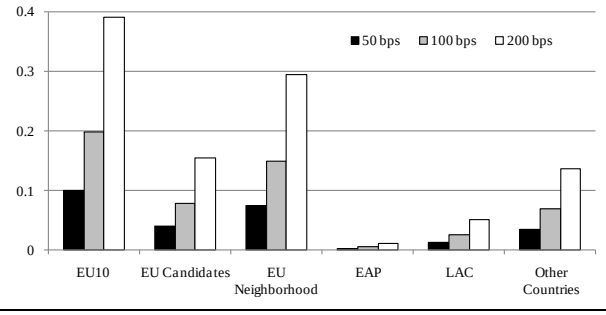
Based on the regression results in Table 3 (column 5), it is possible to simulate the likely impact of increases in lending rates in advanced economies of the kind discussed in Table 1. Since the reliance of each region on banking flows is quite different, the impact also varies across regions. Of course these simulations should be viewed with caution as they assume there are no other changes. For instance, the implicit assumption is that the behavioral responses will remain as valid even after a structural change of the kind introduced by the new Basel III requirements. Moreover, the calculations do not control for a reassessment of risks in emerging market economies following the global financial crisis. In fact, it could be argued that on this count alone capital flows are likely to be much more subdued than in the pre-crisis period.

Disregarding these caveats, we expect that emerging markets will record a decline of 3 percent in banking inflows for each 100 basis points decline in interest differentials—a change in line with the MAG and IIF reports. At the level of each region, the aggregate impact depends also on the reliance of individual countries on banking flows prior to the crisis. Again, we choose two different scenarios: the first is relative to the average inflows during the 2006-08 period and the second is relative to the average inflows of 2007, and in both cases we assume different declines in interest differentials; namely, 50, 100, and 200 basis points. Not surprisingly, the impact varies significantly across regions, ranging from ¼ percent of GDP among the EU10 to negligible levels in the EAP and LAC regions (Figure 4, Panels A and B).[10] Thus, for some regions, emerging Europe in particular, the impact is not negligible and this would add to the likely broader reassessment of emerging markets risk mentioned earlier.

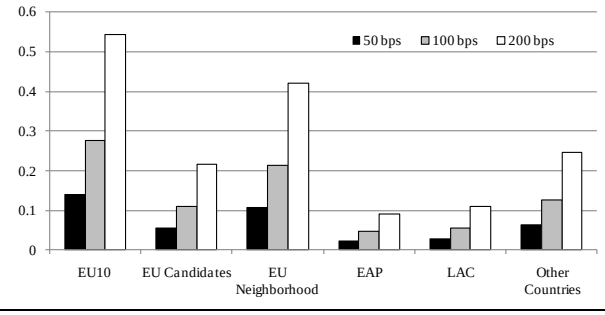
[10] The average inflows to emerging Europe over the 2006-08 period was about 7 percent of GDP, thus resulting in a decline of 0.28 percent of GDP for each 100 basis point decline in interest differentials. This assumes, however, that there are no changes in interest rates in borrowing countries.

Figure 4. Potential Impact of Basel III in Banking Flows to Emerging Markets (% of GDP)

Panel A. Based on Average Banking Flows (2006-08)



Panel B. Based on Banking Flows in 2007



Source: Authors' calculations.

VII. Concluding Remarks

This paper examines the main drivers of banking flows to emerging markets. In addition to examining the global "push" factors that capture the global environment and the domestic "pull" factors that are important in determining banking flows, we focus on the specific linkages between country pairs of lenders and borrowers that matter for banking flows. In particular, we explore the degree to which the financial interconnectedness among countries impacts banking flows as well as any observed differences across regions. Two such indicators are explored. The first relates to the degree to which exposure of a lending country to a specific borrowing country is a disincentive to lend (home country exposure). While on average this is the case in emerging markets, an interesting finding is that this exposure is not statistically significant among the EU10 and EU candidate countries. That is to say concentration of the lender's portfolio in an EU10 or EU candidate borrower country is not a disincentive for lending, but such concentration does appear to reduce banking flows in other regions (EU neighborhood, LAC and other emerging markets). This would suggest that the nature of interconnectedness or commitment may be stronger in the EU10 and EU candidate countries. While we cannot examine further the factors behind this result, it is possibly due to the important role of parent banks in this region that enhance the relations-based financing aspects and thus provide greater stability to banking flows.[11] Indeed, this observation is consistent with the developments during the 2008 global financial crisis, where given the unusually large banking flows that preceded the crisis, one may have expected a larger decline once the crisis erupted than what occurred in practice.

Another interesting result relates to the reliance of borrowers to few lenders for banking flows—the host country exposure. Here too, we would expect this to act as a disincentive for new flows and indeed this is the case in all regions (except, marginally, among the EU candidates). However, judging for the magnitude of individual coefficients, it is worth noting that this disincentive does not appear to be as strong among emerging Europe countries.

The paper also looks at the extent to which portfolio rebalancing and contagion takes place through advanced economies themselves following a capital account crisis in an emerging market to which an advanced economy is exposed. The indicator used allows us to assess the depth of the exposure of any one advanced economy to the emerging market facing a capital

[11] For a discussion on the stability features of parent bank funding see Mitra et al. (2009).

account crisis. We find that quite a few of the previous capital account crises have resulted in portfolio rebalancing; that is, banking flows to other emerging markets have fallen following a crisis in one emerging market, though the strength of the link varies across these episodes.

We also examine the role of the different factors in affecting banking flows during the 2008 global financial crisis. As expected, the bulk of the decline in banking flows to emerging markets was on account of global developments. But an important additional role was played by financial interconnectedness. In contrast, local pull factors on average played a supportive role.

Also, based on the estimated relationship of the different drivers, we analyze the likely (short-term) impact of the increase in capital requirements of Basel III on banking flows to emerging markets. The increase in capital that will be needed in response to the full set of regulatory changes and the consequent impact of the higher capital on lending rates, lending volumes and economic activity in advanced economies is still highly uncertain. This paper finds that a 100 basis points increase in the lending rates of advanced economies (i.e. a 100 basis points decline in the interest differential between the emerging markets and advanced economies) would result in a 3 percentage point decline in banking flows to emerging markets through what we have referred to as the financial flows channel. Given the differences across regions in terms of their reliance on banking flows, the level impact varies across regions; at most, it would average about ¼ percent of GDP among the EU10 countries.

Finally, the fact that banking flows seem to be more stable in some regions brings to the fore the role of foreign capital (and foreign savings) in growth. There is an extensive literature suggesting that foreign savings are detrimental for growth. They are said to substitute for national savings and thus have a limited impact on long-run growth (e.g., Aizenman et al., 2007). The usual explanation is that the absorptive capacity of developing countries remains limited despite the availability of financing and, as a result, foreign savings only trigger a real overvaluation of the currency, which in turn weakens the profitability of investment. The fact that there are differences across regions in the stability of banking flows would suggest that under certain conditions capital flows (and foreign savings) might support growth outcomes; this is a subject that requires further research.

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Appendix 1. Proposed Basel III Reforms

The proposed Basel III reforms aim to strengthen micro-prudential regulation (to help raise the resilience of individual banking institutions) and macro-prudential regulations (to address system-wide risks which can build up across the banking sector as well as the pro-cyclical amplification of these risks over time). While the cornerstone of the reforms is stronger capital and liquidity requirements, these are being buttressed by measures to improve supervision, risk management and governance, as well as transparency and disclosure. The measures which have already been agreed by the Committee and the Governors and Heads of Supervision (September 2010) include:

- Strengthening the quality, consistency and transparency of capital to ensure that banks are better able to absorb losses. Tier 1 capital will need to be predominately in the form of common shares and retained earnings, Tier 2 capital instruments will be harmonized and Tier 3 capital will be eliminated.
- Raising the level of the minimum capital requirements. Under the current Basel II, core and regular Tier 1 capital are 2 and 4 percent. Under Basel III, core Tier 1 capital will rise to 4.5 percent and Tier 1 capital will rise to 6 percent. The phased in period is as follows: core Tier 1 capital in January 2013 to 3.5 percent, January 2014 to 4 percent, and January 2015 to 4.5 percent. The difference between the total capital requirement of 8 percent and the Tier 1 requirement can be met with Tier 2 capital. Also, a capital conservation buffer of 2.5 percent on top of Tier 1 is to be introduced to ensure that banks maintain capital that can be used to absorb losses during periods of financial and economic stress. While banks are allowed to draw on the buffer during such periods, the closer their regulatory capital ratios approach the minimum requirement, the greater the constraints will be on earnings distributions. (Currently, under Basel II, there is no capital conservation buffer). Capital conservation buffer beginning in Jan 2016 to 0.625 percent, January 2017 to 1.25 percent, Jan 2018 to 1.875 percent and Jan 2019 to 2.5 percent. Under Basel III total common equity requirement will rise to 7 percent.
- Increasing the risk coverage of the capital framework, in particular for trading activities, securitizations, exposures to off balance sheet vehicles and counterparty credit exposures arising from derivatives.
- Introducing an internationally harmonized leverage ratio to serve as a backstop to the risk-based capital measure and to contain the buildup of excessive leverage in the system.
- Raising the standards for the supervisory review process (Pillar 2) and public disclosure (Pillar 3), together with additional guidance in the areas of sound valuation practices, stress testing, liquidity risk management, corporate governance and compensation;
- Introducing minimum global liquidity standards consisting of both a short term liquidity coverage ratio and a longer term structural net stable funding ratio.
- Promoting the build-up of capital buffers that can be drawn down in times of stress, including the capital conservation buffer mentioned above and a countercyclical buffer to protect the banking sector from periods of excessive credit growth. The proposed countercyclical buffer will be within a range of 0-2.5 percent of common equity and will be implemented according to national circumstances.

The Committee is also working with the FSB to address risks of systemically important banks—agreement has been reached between the Committee and the Governors and Heads of Supervision that these banks should have loss absorbing capacity beyond the minimum standards of the Basle III framework. Going forward, the BCBS will also be working on a) a fundamental review of the trading book; b) a review of the use and impact of external ratings in the securitization capital framework; c) the treatment of large exposures; d) enhanced cross-border bank resolution; e) a review of the core principles for banking supervision to reflect the lessons of the crisis; and f) standards implementation and stronger collaboration among bank supervisors.

Appendix 2. Country Sample

Home or reporting (country *i*) [17]	Host or counterparty (country *j*) [38]	Region (for country *j*)
Austria	Albania	EU Candidates
Belgium	Argentina	LAC
Denmark	Belarus	EU Neighborhood
Finland	Brazil	LAC
France	Bulgaria	EU10
Germany	Chile	LAC
Greece	China	EAP
Italy	Colombia	LAC
Japan	Croatia	EU Candidates
Netherlands	Cyprus	Other Countries
Norway	Czech Republic	EU10
Portugal	Estonia	EU10
Spain	Hungary	EU10
Sweden	India	Other Countries
Switzerland	Indonesia	EAP
United Kingdom	Kazakhstan	Other Countries
United States	Korea, Rep.	EAP
	Latvia	EU10
	Lithuania	EU10
	Macedonia, FYR	EU Candidates
	Malaysia	EAP
	Mexico	LAC
	Morocco	Other Countries
	Peru	LAC
	Philippines	EAP
	Poland	EU10
	Romania	EU10
	Russian Federation	Other Countries
	Serbia	EU Candidates
	Slovak Republic	EU10
	Slovenia	EU10
	Taiwan, China	EAP
	Thailand	EAP
	Tunisia	Other Countries
	Turkey	EU Candidates
	Ukraine	EU Neighborhood
	Venezuela, RB	LAC
	Vietnam	EAP

Appendix 3. Definitions and Sources of Variables

Variable	Definition and construction	Source
Dependent Variable		
Change in external position	Exchange-rate-adjusted change in external position of reporting banks in advanced country *i* (home) vis-à-vis emerging market *j* (host), expressed in millions of US$.	BIS Locational Banking Statistics.
Global Push Factor		
S&P 500 volatility index	Chicago Board Options Exchange Volatility Index (VIX), end of year, in logs.	Bloomberg.
Local Pull Factors		
Trade openness in country *j*	Trade (sum of exports and imports) of goods and services, express as a percentage of GDP, in country *j*.	IMF World Economic Outlook.
Exchange rate regime in country *j*	Exchange rate arrangements (coarse classification), ranging from 1 to 5: higher, more flexible. The original series goes up to 2007 and is extended by consulting several materials.	Reinhart and Rogoff (2004), and Ilzetzki, Reinhart and Rogoff (2008).
Current account balance in country *j*	Current account balance, expressed as a percentage of GDP, in country *j*	IMF World Economic Outlook.
Fiscal balance in country *j*	General government fiscal balance, expressed as a percentage of GDP, in country *j*	IMF World Economic Outlook.
Capital account openness in country *j*	An index measuring the degree of capital account openness. Higher values reflect that a country if more open to capital transactions. The series goes to 2008, and, for 2009, the values in 2008 are used.	Chinn and Ito (2006 and 2008).
Bilateral Links		
Per capita GDP, PPP, in country *j*	Per capita GDP, PPP (international $), in country *j*, in logs.	IMF World Economic Outlook.
Per capita GDP, PPP, in country *i*	Per capita GDP, PPP (international $), in country *i*, in logs.	IMF World Economic Outlook.
Differential real GDP growth between country *j* and country *i*	Real GDP growth differential between country *j* and country *i*, expressed in percentage points.	IMF World Economic Outlook.
Change in bilateral exchange rate	Percentage change in nominal bilateral exchange rate. Bilateral exchange rate is defined as currency in country *j* per currency in country *i*. The methodology in Ghosh et al. (2005) is employed to adjust extreme values.	IMF World Economic Outlook.
Lender and Borrower Links		
Differential interest rate between country *j* and country *i*	Nominal money market interest rate differential between country *j* and country *i* (i.e., interest rate in country *j* minus interest rate in country *i*), expressed in percentage points. Extreme values are adjusted, by following the methodology in Ghosh et al. (2005).	IMF International Financial Statistics.

Appendix 3. Definitions and Sources of Variables (continued)

Variable	Definition and construction	Source
Banking exposure to country *j*	External position of reporting banks in country *i* vis-à-vis country *j*, expressed as a percentage of total external position of reporting banks in country *i*.	BIS Locational Banking Statistics.
Banking exposure to country *i*	External position of reporting banks in country *i* vis-à-vis country *j*, expressed as a percentage of total external position in country *j*.	BIS Locational Banking Statistics.
Common Lender Effects		
	External position of reporting banks in country i vis-à-vis crisis countries, as a percentage of total external position of reporting banks in country *i*. Crisis countries are as follows:	BIS Locational Banking Statistics.
Mexico	Mexico, in 1995.	
Russia	Russia, in 1999.	
East Asia	Indonesia, Korea, Malaysia, Philippines and Thailand, in 1998.	
Turkey	Turkey, in 2001.	
Argentina	Argentina, in 2002.	
Europe	Bulgaria, Hungary, Latvia, Lithuania, Romania and Ukraine, in 2008.	
Countries in Ghosh et al. (2008)	Countries listed in Table 4.1 (p.21) in Ghosh et al. (2008).	